Semigroups with Identities are closed by Semi-group Operations with Inverses

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Received: Januray 31, 2023, Manuscript No. MATHLAB-23-91318; **Editor assigned:** February 2, 2023, PreQC No. MATHLAB-23-91318 (PQ); **Reviewed:** February 16, 2023, QC No MATHLAB-23-91318; **Revised:** February 21, 2023, Manuscript No. MATHLAB-23-91318 (R); **Published:** February 28, 2023

Introduction

Semigroups can be viewed as a special case of magma, where the operations are associative and can be viewed as a generalization of groups without the need for identities or inversions to exist. As with groups or magmas, semi-group operations need not be commutative. A well-known example of an associative, no-commutative operation is matrix multiplication. If the semi-group operation is commutative, then the semi-group is called a commutative semigroup or (although less commonly than for analogous groups) an abelian semigroup. The algebraic structure between a semigroup and a group, a monoid, is a semigroup with identity and obeys all but one of the group axioms. Monoids do not require the existence of reciprocals.

Description

A natural example is strings that use concatenation as the binary operation and the empty string as the identity. The restriction on non-empty strings gives examples of non-monoid semi-groups. Positive integers with addition form a non-monoid commutative semigroup, non-negative integers form a monoid. Semi-groups without identities can be easily transformed into monoids by adding identities. As a result, monoids are studied in semi-group theory rather than group theory. In mathematics, a semigroup is a non-empty set with associative binary operations. A special class of semigroups is a class of semigroups that satisfies additional properties or conditions. Thus the class of commutative semigroups consists of all semigroups whose binary operations satisfy the commutative property ab=ba for all elements a and b of the semigroup. The class of finite semigroups consists of semigroups whose underlying set has finite cardinality. Members of a class of Brandt semigroups must not only satisfy one condition, but also some additional properties. A large collection of special classes of semigroups have been defined, but not all have been studied with equal intensity. In the algebraic theory of semigroups, in constructing special classes, attention is paid only to the properties, constraints, and conditions that can be expressed in the binary operations of semigroups, and in some cases cardinality and similarity of subsets of semigroups. Attention is drawn to the properties of underlying sentences. The underlying set is not supposed to preserve any other mathematical structure such as order or topology. As in other algebraic theories, one of the main problems in the theory of semigroups is the complete description of the classification of all semigroups and their structure. In the case of semigroups, the classification problem can be considered very difficult because the binary operation is only needed to satisfy the connectivity. Structural descriptions are available for certain special classes of semigroups. For example, the structure of the idempotent set of holomorphic semigroups is perfectly known.

Conclusion

Structural descriptions are represented by the more familiar types of semigroups. The best-known form of semigroups is the group. Here is a (necessarily incomplete) list of various special classes of semigroups. Whenever possible, the defining properties are formulated in terms of the binomial operation of the semigroup. In abstract algebra, a branch of mathematics, monoids are sets with associative binomials and identities. In abstract algebra, a branch of mathematics, monoids are sets with associative binomial operations and identities. For example, non-negative integers with addition form a monoid with identity 0. A monoid is a semigroup with identity. Such algebraic structures occur in several areas of mathematics.